Dan Slilaty

Orientations of biased graphs and their matroids, with applications to hyperplane arrangements and surfaces

Abstract for the Combinatorics Seminar September 27 et seq., 1999

A matroid is a combinatorial abstraction of linear independence. Matroids have been developed considerably in the mathematical literature this century. They have applications to: geometry, topology, combinatorial designs, and many other subjects, including graph theory!

Orientations of matroids generalize orientations of graphs, which involve placing various arrows all over the graph. Orientation of matroids is a much more general and abstract concept than orientation of graphs, but graph orientations will give us a nice, concrete way of looking at various classes of oriented matroids.

In this series of talks we will develop in detail orientations of different types of graphs and how they relate to orientations of the corresponding matroids. There will be applications to arrangements of real hyperplanes in euclidean space and embeddings of graphs in surfaces.

This talk will be accessible to any first year graduate student, as I will be going over the basics of matroids and graphs.